Little Grassbird *(Megalurus gramineus)*
Ten in samphire and mangal at south Cygnet Marsh on 17 October 1980 and two on 10 November 1982. Mostly seen perched on pneumatophores of *Avicennia*.

Yellow White-eye *(Zosterops lutea)*
The most common mangal-inhabiting bird. Flocks of up to 7 at north and south Cygnet Marsh on all visits.

Singing Honeyeater *(Meliphaga virescens)*
Two in mangal at north Cygnet Marsh on 11 November 1982.

White-breasted Woodswallow *(Artamus leucorhynchus)*
Moderately common. Ten over mangal at south Cygnet Marsh on 17 October 1980 (including 3 pale-headed juveniles) and 8 at the same place on 10 November 1982.

Little Crow *(Corvus bennetti)*
Fifteen (including some immature birds) at south Cygnet Marsh on 17 October 1980. Several old nests in the mangal there also. This species nests on power poles at the Dampier Salt Works (pers. comm. J. Theunissen).

DISCUSSION

Most of the species in the preceding list are waterfowl and waders attracted to the open waters of the lagoons and surrounding shallows. Only five species are dependent on the mangal, namely the Mangrove Heron, Mangrove Grey Fantail, Dusky Flyeater, Yellow White-eye and White-breasted Woodswallow.

The low numbers of Laro-limicolae (shorebirds, terns etc.) observed on Lake MacLeod is in stark contrast to the large numbers occurring on other salt fields on the Western Australian coast such as Leslie Salt (near Port Hedland) and Dampier Salt (at Karratha).

The salt works at Lake MacLeod is unique in Western Australia in that the brine pumped from beneath the lake floor into evaporating ponds is supersaturated and contains little oxygen and few invertebrates. At Leslie Salt and Dampier Salt (Karratha) sea water is pumped through a series of ponds which gradually increases its salinity by evaporation. The first few ponds in this staging process are rich in oxygen and invertebrates which attract huge numbers of waders.

Presumably the ponds at Lake MacLeod are unsuitable for Laro-limicolae because of their high salinity.

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POSSIBLE HYBRIDS BETWEEN *BANKSIA HOOKERANA* AND *B. PRIONOTES* (PROTEACEAE)

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ABSTRACT

Analysis of a distinctive group of *Banksia* shrubs near Lake Indoon, suggests that they may be hybrids between *Banksia hookerana* and *Banksia prionotes*

INTRODUCTION

In 1982 I was advised of a possible hybrid between *Banksia hookerana* Meisn. and *B. prionotes* Lindl. near Lake Indoon; a freshwater lake, 11 kilometres west

of Eneabba towards Leeman, in Western Australia. Since hybrids have been rarely reported in the genus *Banksia* in Western Australia, a subsequent survey of the area has been undertaken and the results presented here.

MATERIALS AND METHODS

Samples of infrutescences (fruiting cones), leaves and flowering spikes were obtained from the suspected hybrids, and the putative parents for comparison. The population and surrounding features were photographed for added documentation, and voucher collections deposited in the Western Australian Herbarium (PERTH).

GENERAL HABITAT DESCRIPTION

The suspected hybrids are a group of 5 mature trees occurring at the base of the eastern side of a large stable sand dune. *Banksia prionotes* is common on the top and higher slopes of the dune. *Banksia hookerana* is found on the extensive flats to the east of the dune. Both species occur in close proximity to the supposed hybrids.

The supposed hybrids are large dome-shaped plants to 3m x 3m, quite unlike the normal shape of *B. prionotes* present in the area, because branching occurs from near the base of the trunk. The smooth grey mottled bark is similar to that of *B. prionotes*, and all shrubs are single stemmed at the base. Essentially the habit is like that of gigantic *Banksia hookerana*.

INFLORESCENCES/FRUITS

All five plants sampled showed pollen fertility levels over 95%; compared to that of a suspected *B. hookerana* x *B. menziesii* hybrid (voucher G. Keighery s.n. 7km W Eneabba; deposited in PERTH) which was 45-55% pollen fertile. The supposed hybrids are to all intents fully fertile, showing little evidence of hybrid sterility.

Inflorescence shape (length and width) fell within the range of *B. prionotes*, but was significantly longer than *B. hookerana*.

Fruiting cones are of similar size to the parent inflorescences, and all cones bore fertile seeds. With the large intra-plant variation in number of follicles per cone it was not possible to ascertain if differences in fertility were present. Although similar in size to those of *B.prionotes* the fruiting cones have persistent old flowers, which is a characteristic of *B. hookerana*.

Seed from the supposed hybrids were viable, and the resulting seedlings are apparently of uniform morphology showing little sign of variation due to segregation of parental characteristics (I.R. Dixon., pers. comm.)

Table 1. Inflorescence measurements in mm.

	Banksia hookerana		*B. prionotes*		unknown	
	Length	Width	Length	Width	Length	Width
1.	88	71	147	75	143	84
2.	87	90	151	92	125	76
3.	76	81	145	83	135	71
4.	100	83	137	79	119	82
5.	94	75	131	87	117	74
$\bar{x}$	89		142		127	

LEAVES

The longest leaf from beneath an inflorescence with open flowers was selected for measurement. These measurements are tabulated in Tables 2 and 3. Representative leaves are illustrated in Figure 1.

All leaf measurements, with the exception of teeth number which was constant between species, showed the unknown *Banksias* to be intermediate between *B. hookerana* and *B. prionotes* strongly suggesting a hybrid origin.

Table 2. Leaf measurements of Banksia "unknown".

	Leaf Length (cm)	Maximum width (cm)	No. Teeth/side (No./cm)	Length/width ratio
A	21.0	1.37	35 (1.7)	15
	22.27	1.47	36 (1.6)	15
B	16.42	1.34	29 (1.8)	12
	19.72	1.33	29 (1.5)	15
C	23.6	1.51	36 (1.5)	16
	20.5	1.37	28 (1.4)	15
D	20.52	1.37	31 (1.5)	15
E	23.0	1.29	31 (1.3)	18

Average leaf length:	20.9
Average leaf width:	1.4cm
Number teeth:	32
Teeth per cm:	1.5
Length/width ratio:	15

Table 3. Leaf Measurements (in cm) of *Banksia hookerana* and *B. prionotes*.

	Leaf Length	Max Width	No. teeth per side (teeth per cm)	Length width ratio
B. prionotes				
	34.58	2.62	34 (1.0)	13
	31.47	2.47	33 (.95)	13
	29.87	2.12	30 (.99)	14
	35.67	3.14	39 (.91)	11
	32.91	2.71	34 (.96)	12
B. hookerana				
	14.81	1.12	37 (2.5)	13
	15.50	.97	34 (2.2)	16
	14.52	1.01	31 (2.1)	14
	15.73	.84	32 (2.0)	19
	17.12	1.07	38 (2.2)	16

	B. prionotes	*B. hookerana*
Average leaf length:	32.9	15.53
Average leaf width:	2.61	1.02
No. teeth:	34	34
Teeth per cm:	1	2
Length/width ratio:	13	16

CONCLUSION

The *Banksias* at Lake Indoon are intermediate in habit, fruit and leaf morphology between *B. hookerana* and *B. prionotes*, which is highly suggestive of a hybrid origin. However, the lack of pollen sterility, and segregation in the offspring is, unusual. I attempted to artificially cross the species, but was unsuccessful, and resolving this problem must await the raising of artificial hybrids.

On balance the plants at Lake Indoon are hybrids between *Banksia hookerana* and *Banksia prionotes*. Currently they are outside the Lake Indoon Recreation Reserve, and because of the rarity of natural hybrids in the genus *Banksia* (or the Proteaceae as a whole) deserve to be given special protection to preserve them for future study.

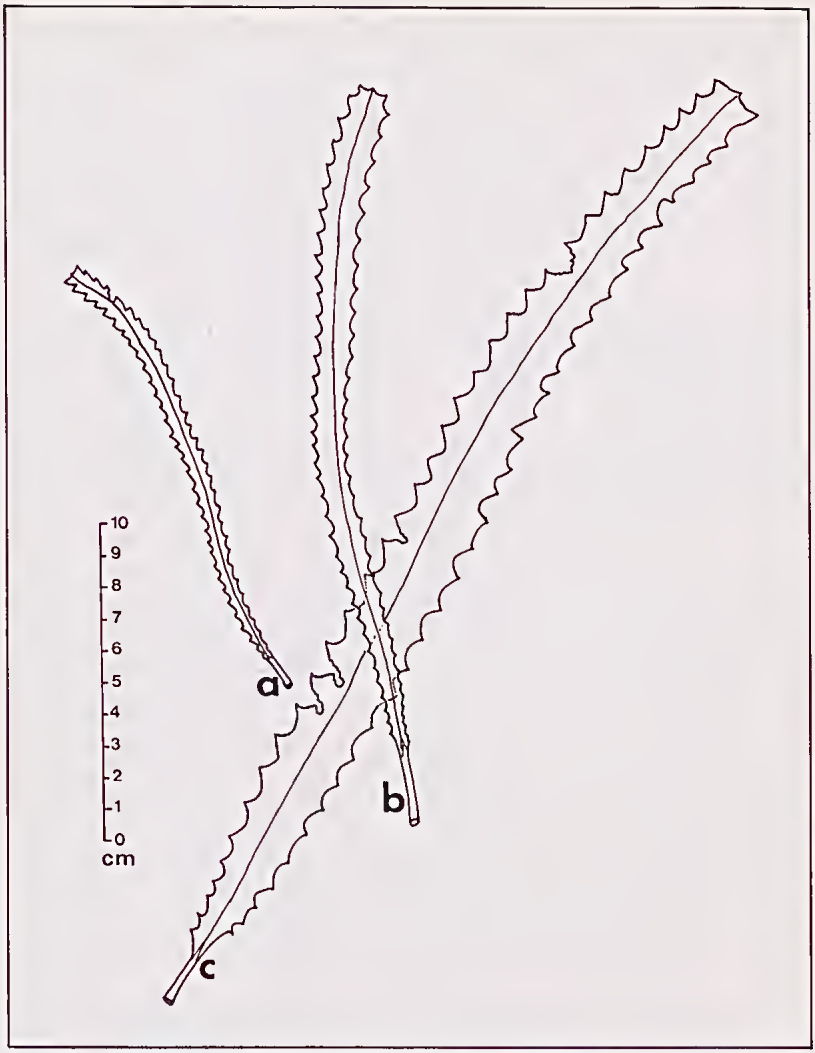

Figure 1. Representative leaves of *Banksia* from the study site.
a: *Banksia hookerana*
b: *Banksia* unknown
c: *Banksia prionotes*

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